

PATENT SPECIFICATION

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DRAWINGS ATTACHED.

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COMPLETE SPECIFICATION.

Improvements relating to Wood Screws.

We, G. K. N. SCREWS AND FASTENERS LIMITED, a British Company, of Heath Street, Birmingham, 18, in the County of Warwick, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to wood screws. By a wood screw is herein meant a screw, the shank of which is formed with a screw thread so shaped as to form its own mating thread in timber or other similarly deformable material (herein referred to under the expression "timber or like material") with the root portions of axially adjacent thread convolutions spaced apart from one another along the length of the shank so that the valleys between axially adjacent thread convolutions are of channel as opposed to V-form in cross section, the screw thread extending to a pointed tip portion at one end of the shank and which is adapted for penetrating engagement with the timber or like material when the screw is initially driven, without the material necessarily being provided beforehand with a pilot or screw receiving hole, the shank at the opposite end being formed with a head having an external diameter larger than that of the adjacent screw shank to secure a timber or other element to the timber or like material into which the screw is driven, and the head having a driving tool engaging portion.

The invention has for its object to provide improvements in wood screws so as to obtain a wood screw which requires less "operator torque" when being driven than does a conventional wood screw of the same size, as used hitherto, which exerts substantially the same holding power against pull-out in the axial direction as does a conven-

tional wood screw of the same size, and which exhibits a greater resistance towards accidental loosening than does a conventional wood screw of the same size.

With these objects in view, according to the invention, we provide a wood screw wherein the screw thread on the shank is provided with grooves, each of which extends helically for substantially the full length of the threaded portion of the shank and intersects the thread on the shank in such a manner as to transform the thread into a plurality of radially outwardly extending protuberances, spaced apart in a helical path around the shank, the number of grooves and the helix angle thereof being chosen so that the resulting protuberances lie in staggered relationship in the axial direction of the shank whereby a protuberance in one convolution of the screw thread lies axially in register, or substantially in register, with the space between the protuberances in an adjacent convolution of the screw thread, with the radial depth of the grooves on that portion of the shank which is adjacent to the pointed tip portion, being of progressively decreasing radial depth, in a direction towards the tip, so as to provide for threaded engagement between the tip portion and the timber or the like material over the whole of the thread convolutions at the commencement of driving of the screw.

An embodiment of the invention is illustrated in the accompanying drawing which shows in side elevation, a wood screw having a shank portion 10 formed with a wood-screw type of screw thread as above defined, and a head 11, the portion of the shank 12 between the head and the threaded portion being plain and of generally cylindrical configuration.

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In accordance with the invention, the normal continuous helical screw thread is interrupted by a number of grooves 13 which extend helically over the threaded portion 10 of the shank and which are arranged so as to intersect the thread, and the path of these grooves is indicated on the drawing by the dotted lines 13a.

As will be observed, this provision of the grooves 13 has the effect of transforming the normal thread into a plurality of radially outwardly extending protuberances 14 which are spaced apart in a helical path around the portion 10 of the shank.

The cross-section of each groove 13 is made such that the leading face 15 of each protuberance is inclined an appreciable amount back from the radial direction, that is to say, the face 15 slopes in the opposite direction to the rotational direction of the screw when being driven in, or in other words, each leading face 15 has an appreciable amount of negative rake.

Thus, the leading face 15 of each protuberance, does not have any cutting action when the screw is being driven into wood, but has an action which is something like swaging in that the leading face 15 displaces the fibres of the wood, pushing these fibres aside without actually severing them so that when the screw is in position and driving has finished, the fibres of the wood in tending to recover, will enter into the spaces between the projections and provide increased resistance to any accidental loosening of the screw.

Further, less torque is required to drive in the screw in accordance with the invention than would be required for the same size screw having a conventional continuous as opposed to an interrupted thread because the area of actual thread encountering frictional resistance to turning, is considerably reduced with a screw according to the present invention, as compared with a screw of the same size with a conventional continuous thread.

It will be observed by comparison of the gaps 16 and 17 with the gaps 18 and 19, that towards the inner end of the threaded shank portion 10, the cross-sectional dimension and thus the width of each groove is gradually reduced so that the groove "runs out" into the cylindrical portion 12 of the shank so as to avoid any appreciable weakening of the cross-sectional area of the shank at this position and maintain adequate shear strength in the shank.

Conveniently, the grooves and protuberances may be rolled onto the shank of an elongated blank in one operation and the form of the rolling dies is preferably such as to produce rounded leading faces 15 having the substantially negative rake above mentioned. The trailing faces 20 of each protuberance do not necessarily have to have

any rounded form, but in production between thread rolling dies, a rounded form may be impressed to these trailing faces.

It will also be observed that the protuberances 14 of alternate thread convolutions are disposed substantially in axial alignment and each protuberance 14 is substantially in register with the gap (17, 18, 19 etc.) in between a pair of protuberances in the next adjacent convolution of the thread form. With this arrangement, the holding faces of the protuberances are distributed equally around the cylindrical envelope of the threaded shank portion so as to provide resistance to axial pull-out which is substantially equivalent to that provided by a conventional wood screw of the same size having a full cylindrical thread form.

The wood screw is provided with the usual pointed tip portion 21, which is adapted for penetrating engagement with the timber or like material when the screw is initially driven, with the screw thread extending over the pointed tip portion 21 to facilitate the initial engagement of the screw, with the timber or like material into which it is driven. For this purpose the grooves 13 on that part 10a of the shank 10 which is adjacent the pointed tip portion 21 are of progressively decreasing radial depth in a direction towards said tip portion, so that at the tip portion 21 the threads are not interrupted at all, and thus have maximum engagement with the part of the timber or like material into which the screw is initially driven.

WHAT WE CLAIM IS:—

1. A wood screw, wherein the screw thread on the shank is provided with grooves, each of which extends helically for substantially the full length of the threaded portion of the shank and intersects the thread on the shank in such manner as to transform the thread into a plurality of radially outwardly extending protuberances, spaced apart in a helical path around the shank, the number of grooves and the helix angle thereof being chosen so that the resulting protuberances lie in staggered relationship in the axial direction of the shank whereby a protuberance in one convolution of the screw thread lies axially in register, or substantially in register, with the space between the protuberances in an adjacent convolution of the screw thread, with the radial depth of the grooves on that portion of the shank which is adjacent to the pointed tip portion, being of progressively decreasing radial depth, in a direction towards the tip, so as to provide for threaded engagement between the tip portion and the timber or like material over the whole of the thread convolutions at the commencement of driving of the screw.

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2. A woodscrew according to Claim 1 wherein the cross sectional shape of each helically disposed groove is such that the leading faces of protuberances are inclined back from a radial plane.

3. A woodscrew according to Claim 1 or 2 and wherein the screw thread is formed over a portion only of the screw shank so that the latter is unthreaded adjacent the screw head, characterised in that the width of each groove is less adjacent the unthreaded part of the shank than at a position nearer the pointed tip portion, so as to maintain maximum shear strength in the shank adjacent the unthreaded portion, consistent with the provision of the grooves for sub-

stantially the full length of the threaded portion of the shank.

4. A woodscrew substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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COMPLETE SPECIFICATION

1 SHEET

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the Original on a reduced scale*